

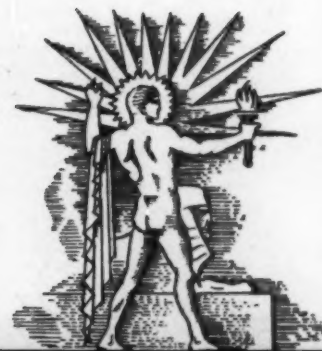
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SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE •



MARCH 9, 1935


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DO YOU KNOW?

Only about two per cent. of the world's crude rubber is taken from wild trees.

France, like the United States, now has a wind tunnel big enough to test a full-sized airplane.

The Romans back in the first century A. D. had the custom of putting statues of famous authors in their libraries.

The giant Irish elk, now extinct, was the biggest member of the deer family that ever lived, with antlers that sometimes spread 11 feet.

With curve-free tracks and advanced dispatching systems, railroad trains could speed across country at 150 to 200 miles an hour, predicts one designer.

For the past 12 years, the U. S. Department of Agriculture has not had any free seed to distribute, yet thousands of people ask uselessly for free seed each year.

French manufacturers are reported to be planning to make electric lamps filled with the rare gases xenon and krypton.

A tiny parasite called *Aphelinus mali* is helping scientists fight the woolly apple aphid and canker disease in North-western apple orchards.

A new type of cabbage developed at Cornell University is said to be non-smelling, and also a little more easily digested than other varieties.

How a muskrat swims, an old subject of argument among naturalists, is believed settled by observations in a clear water pool at Louisiana State University.

Indians of Guatemala still use the color symbolism of the ancient Mayas in their textiles: black represents the color of weapons made of obsidian; yellow, the color of corn, symbolizing food; red, the blood of sacrifice; and blue, royalty.

WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the articles.

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PHYSICS

Very Short Radio Waves Travel Record Distances

Warm Air Over Colder Masses Called Cause of Unusual Transmission at Harvard of Waves Under 3 Yards Long

VERY short radio waves, only a few feet in length, have traveled record distances in Harvard experiments and warm air currents riding above colder air masses are believed to be responsible.

Using a $1\frac{1}{4}$ meter wavelength, signals have been exchanged between a Cambridge experimental station and one at Mt. Wachusett, Mass., a distance of 68 miles and probably a record for $1\frac{1}{4}$ meter transmission.

Another record for $2\frac{1}{2}$ meter transmission, is believed to have been established in the exchange of signals by the Blue Hill observatory and a station on Mt. Washington, N. H., a distance of 142 miles.

These unusually successful results are probably due to temperature inversions, according to Prof. Charles F. Brooks, director of Harvard's Blue Hill meteorological observatory, who has had a leading part in the university's ultra-high frequency radio research.

Ordinarily, air temperature drops with increase in altitude, temperature inversion occurring when the regularity of this fall in temperature is interrupted. Inversions are common at night, when the lower air is chilled. They are also caused by a warm current of air flowing above cold air near the earth or by a unusually cold current flowing close to the ground under warmer air at a moderate height.

There is a possibility of temperature inversion at four levels, says Prof. Brooks; in the Kennelly-Heaviside region; at the base of the stratosphere; in the middle of the troposphere; and near the ground. Only the last two, however, seem to be of consequence in ultra-high-frequency transmission.

It is Prof. Brooks' theory that when a temperature inversion occurs, the radio waves which spread horizontally through the atmosphere are refracted in passing from cold or relatively dense air into a layer of warm or light air. This refraction is similar to, but very much less than, the refraction of a

beam of light which passes from water into air.

Additional observations by G. W. Pickard, research associate at Blue Hill, on transmission and reception of 5 meter wave signals, showed that there is a well defined daily change in signal strength, with good reception during the night, best reception during morning and evening, and poorest reception near noon. His automatic records also indicate that there is probably a seasonal fluctuation, with best transmission during the summer.

The usual summertime inversion of temperature over the cold waters off the coast of Maine is believed to have been responsible for two exceptionally long distance transmissions of 5-meter signals last summer.

One was a signal sent from Blue Hill and picked up in a boat off Mount Desert Island, Me., more than 200

miles away. Later in the summer, 5-meter signals from West Hartford, Conn., were received on Mt. Cadillac, Mount Desert Island, Me., a distance of almost 300 miles.

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PHYSIOLOGY

Boy With Hairy Coat Studied in Kharkov

ASO-CALLED "dog-boy" like the famous Jo-Jo exhibited by Barnum many years ago is living in the city of Kharkov, U. S. S. R.

The child is entirely covered, face and body, with long blond hair having somewhat the texture of goat hair, coarse and a little wavy. He is being studied in the children's hospital and clinic in Kharkov.

The child is now four years old and according to the last report is in good health except for a case of rickets for which he is being treated. He is normal mentally as well as physically. Both parents and the boy's older sister are normal in every respect and no similar condition has occurred in any member of the family on either side, so far as the parents know.

The condition is known to scientists as hypertrichosis universalis. It is a con-



RARE DEFECT

This little lad, like Barnum's famous Jo-Jo, suffers from an inherited defect.

genital defect like harelip and is thought to be due to an arrested development of certain structures of the body. The first hair coat, which covers the body of a child before birth and is usually shed soon after birth, persists in cases like this of the Russian lad. The development of nails and teeth may also be faulty, and one authority questions whether such persons ever get a set of permanent teeth.

The condition is very rare. Perhaps not more than 30 unrelated families

having it are known. Most of the cases have been reported from Russia. In the Russian cases the hair is light, while in cases reported from India the hair was dark. Previous studies show that once the condition appears, it will very probably appear in the next generation.

The Kharkov boy's chances of making a living by appearing in circus side-shows is slim, because the Soviet Union does not countenance exhibitions of this sort.

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PHYSICS

Ultraviolet Rays Audible With New Detecting Device

Old Tin Can and Jet of Water Used by Scientist To Determine Strength of Invisible Rays

AN OLD tin can, a bit of old rubber sheeting, a water jet, and a spark gap are essential parts of a new ultraviolet detecting apparatus developed by Dr. R. D. Summers of the physics department of the University of Pennsylvania (*Review of Scientific Instruments*, February).

With the simple and inexpensive equipment it is possible to hear the presence of the soundless and invisible rays which cause sunburn and likewise prove the presence of the still more piercing radiation from radium.

Dr. Summers took an old tin can, cut out the top and bottom and mounted a piece of rubber sheeting across one end. Placing the can on its side he directed a fine stream of water against it. When no vibrations were present the water jet hit the rubber and flowed silently to a collecting trough. Vibrations, however, make the water stream strike with less smoothness and—like the string and can telephone systems of boyhood—the sound comes out as a rattle and chatter.

The same sounds issue from the can when a source of ultraviolet light or radium rays is brought into the vicinity of the apparatus.

So sensitive is the device that the ultraviolet light from a match held several yards away can be detected.

The frequency of the clicks issuing from the apparatus, Dr. Summers finds, is a measure of the intensity of the ultraviolet light or of the radium rays.

Immediately adjacent to the water jet is a spark gap connected to a 2,000 volt source obtained from a small transformer like those used in lighting neon advertising signs and passed through a rectifying radio tube to convert it into direct current.

The spark gap is adjusted to a distance where the spark is just unable to jump the gap. Attached to one spark gap terminal is an electrode set close to the stream of water issuing from the jet. Being charged to 2,000 volts it attracts the water stream slightly.

As ultraviolet light or radium rays fall on the copper terminals of the gap electrons are emitted and the conductivity of the gap cut down. At the same time the electrical voltage on the gap is decreased. Hence the attraction of the terminal for the water jet is varied and the stream falls on a different place on the rubber sheet of the tin can.

It is the minute varied spraying of the water stream on the rubber—like a gardener watering a lawn—which creates the tell-tale sounds and thus detects ultraviolet light.

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The birthrate in England and Wales in 1933 was the lowest in the records of those countries.

Waterfowl that get their feathers soaked in oil-polluted water are apt to die from cold, starvation, or drowning.

PUBLIC HEALTH

Big Increase Reported In Scarlet Fever

MORE cases of scarlet fever are being reported to the U. S. Public Health Service each week this winter than at any time since 1928. The increased prevalence of this disease is widespread. Over one hundred new cases were reported during one week from each of sixteen states. For the week ending February 23, latest for which figures are available, more than six thousand cases were reported.

This is less than were reported the week before, but health authorities believe the drop is only temporary. The peak in number of cases is not due for another two or three weeks. Scarlet fever cases always increase gradually from early fall until a high point is reached in the middle of March, when the number of new cases falls off sharply again. The present increase is considered the regular seasonal one, but it is much greater than any for the past six years.

Measles is also widely prevalent. Nearly as many cases are being reported this year as last, when the largest number ever recorded was reported.

The general deathrate and cases of meningitis and smallpox have all risen slightly this year. Health authorities are not worried about this, however, as the record good health of the country in 1933 and the early part of 1934 was so unusual that it could not be expected to last.

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ASTRONOMY

100-Inch Telescope Mirror Now Wears Aluminum Coat

THE GIANT 100-inch diameter mirror of the Mt. Wilson world's largest telescope now wears a coat of reflecting aluminum instead of conventional silver.

Dr. John Strong, California Institute of Technology physicist who developed the process for putting aluminum surfaces on glass mirrors in a vacuum, breathed a sigh of relief when the biggest job he has ever undertaken came to a successful conclusion.

Astronomers foresaw similar coating of the still larger 200-inch mirror now cooling at the Corning Glass Works. Moreover, they were remembering the potential savings of millions of dollars

for astronomy, for aluminum surfaces make telescopes work so much better that a 60-inch mirror instrument is as good as a 100-inch instrument. The difference in cost is nearly a million dollars.

Coating of the present world's champion telescope mirror with aluminum is the culmination of a series of experiments rushed through in the last few weeks.

Just a few days ago the 60-inch mirror at Mt. Wilson was aluminized and hurried back into place to test its im-

proved reflecting power. Ten smaller auxiliary mirrors have likewise been coated.

The previous champion of aluminized telescopes was the 36-inch mirror at Lick Observatory, also coated by Dr. Strong with his vacuum evaporation apparatus. This mirror was found to give fifty per cent. better reflection than ordinary silver for photographic purposes. The aluminum surface does not need to be re-applied frequently as does silver.

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MEDICINE

Short Radio Waves Used For Treating Parts of Body

SHORT radio waves promise speedy relief for the particular kind of painful and often disabling lame shoulder or elbow which physicians call bursitis. This new medical use of short radio waves was announced by Dr. Willis R. Whitney, vice president in charge of research of the General Electric Company.

Bursitis was described by Dr. Whitney as "sand in the human bearings." A bursa is a small closed sac. There are many of them in the body, generally lying between muscles and tendons, and containing a little thin liquid. Their function seems to be that of lubrication, making the motion of muscles easier. Stony deposits which may be seen by X-ray pictures are sometimes found in these sacs—the sand in the bearings. Injury, infection or unusual exercise of an arm or shoulder are thought to be causes of the condition.

Until recently surgical removal of the deposit with the bursa has been the best method of treatment, Dr. Whitney pointed out. It now looks as if surgery would be unnecessary in the future because enough heat can be induced in the body by high frequency currents to dissolve the lime deposits.

Dr. Whitney reported successful treatment of two cases of bursitis by his high frequency apparatus. Some years ago he developed a high frequency induction method of producing artificial fever for the treatment of paresis. Further research on high frequency currents led to discovery of their usefulness for treating bursitis.

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Use of short-wave radio in medicine is no new thing; it has been successfully employed for several years in the treatment of certain diseases requiring a rise in temperature. Hitherto, however, the whole patient has been put into a state of "artificial fever." Dr. Nagelschmidt's advance consists in finding a method for localizing the effect.

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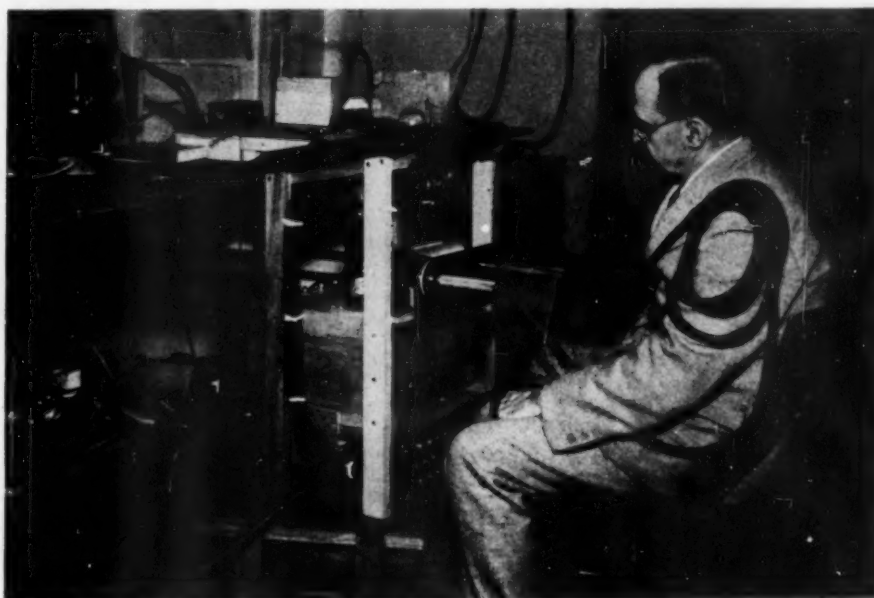
ARCHAEOLOGY

Cornfield Discovered Beneath Georgia Mound

AN INDIAN cornfield of the "deep South" so old that, after it was abandoned, an Indian mound was built on the furrowed ground, has been discovered near Macon, Ga., in perfect condition.

The cornfield reveals a system of cultivation known to the ancient mound builders of the South but entirely different from the typical Indian method of corn-growing. The field, discovered under the mound, was preserved through perhaps a thousand years by the sand mound raised over it and a thick cap of red clay loam over that which shut out rain and weather influences.

Discovery of the field is announced by Dr. A. R. Kelly, who has been mak-



TREATING LAME SHOULDER WITH RADIO WAVES

Patients suffering from the painful, disabling kind of lame shoulder known as bursitis may be treated by short radio waves instead of surgical operation. The coil wrapped around the shoulder of Dr. W. R. Whitney, General Electric Company researcher, carries the high frequency currents which induce enough heat in the body to dissolve the lime deposits that cause the trouble.

ing extensive explorations of Indian mounds and village sites near Macon for more than a year. The work was inaugurated as a Smithsonian C. W. A. project, and is now being continued by the State and local F. E. R. A. in cooperation with the Society for Georgia Archaeology.

Air views show the parallel rows of furrows that crossed the ancient field, as plain as the furrows in a modern cornfield near by. The ancient and modern fields look strikingly similar. But this is a superficial resemblance, says Dr. Kelly, for the straight rows today are achieved by the plow, something unknown to the prehistoric farmers of America.

The so-called Indian way of planting corn, taught to colonists of New England by friendly Indians, was to heap up little hills of earth at intervals all over a field. Each hill was planted with a few kernels, and manured, hoed, and tended as a separate farm unit.

The cornfield discovery, explains Dr. Kelly, shows that prehistoric agriculturists of Georgia hoed their corn, pulling up the soil around the plants in close-set hillocks arranged in furrows. So regular was the pattern of hillocks that only a slight curving contour shows when the field is seen from a height or distance.

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GEODESY

Moon Varies Distance Between Europe and U. S.

63-Foot Difference Found by Harvard Astronomer And New York Scientist By Study of Radio Signals

TIDES in the solid earth which alter the distance between the North American and European continents by as much as 63 feet have been discovered by Prof. Harlan T. Stetson, visiting research associate in astronomy at Harvard University, and Dr. A. L. Loomis, New York banker and scientist who operates as a serious hobby the Loomis Laboratory, Tuxedo Park, New York. These tides in the earth are believed to be caused by the moon through its gravitational pull much in the same manner as it causes ocean tides.

They were discovered by the two scientists when discrepancies in astronomically checked clocks in Europe and in North America increased and decreased regularly with changes in the moon's position.

According to Dr. Stetson and Dr. Loomis, discrepancies between European and American clocks, astronomically checked, indicate that the average difference between the two continents may be increased by as much as 32 feet when the moon is pulling them apart. When the moon pulls them together they may be closer to each other by the same distance.

In conducting their experiments, the two used United States time signals checked at Washington and broadcast

from the Naval Station at Arlington, Va., English time signals checked at Greenwich and broadcast from Rugby, and French time signals checked at Paris and broadcast from Bordeaux. At specified times, each station picks up the signals of the other two.

Discrepancies between time signals from Arlington and from Rugby were found to rise and fall with the moon's position. A very similar curve designated the differences between Arlington and Bordeaux signals. Between Rugby and Bordeaux, however, no such relationship was found, indicating that the phenomenon does not take place between England and France.

By a stretching of rocks, Dr. Stetson says, it is well within the realm of possibility for the two continents to move as much as 63 feet apart. Such a movement would be equivalent to stretching a rock a yard long less than .0004 inch, an amount well within the elastic limit even of solid granite.

It was at first thought that changes in the amount of time required for trans-Atlantic radio transmission might be the cause of the discrepancies, or that the moon might lift the Heaviside ionized layer which reflects radio waves and thus give them a longer distance to travel.

Upon checking this, it appeared that

no alteration in the Heaviside layer could account for the large size of the time discrepancies. In considering these aspects it was found that the average length of time required for trans-Atlantic transmission is approximately .04 second.

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ENGINEERING

Use Colored Concrete in Fight Against Accidents

ROADS the hue of the gay, orange-colored marigold flowers are the latest idea tried by British highway engineers in their intensive campaign to reduce the toll of accidents.

Short experimental stretches of this marigold road have already been laid down in several parts of the country, and Leslie Hore-Belisha, Britain's energetic Minister of Transport, has approved further trials on a large scale.

The chief advantage claimed for this coloring is that it reduces sunlight glare during the day and dazzle at night, while it is also suggested that these colored roads will give pleasure to the traveler's eye.

This experiment has already been tried out in the Channel Islands—Britain's small islands off the coast of France. Here the marigold roads were bordered by a white curb, an effective combination which was found to prevent glare, define the road in all lights and to allow cyclists and pedestrians to be easily picked out by the headlights. Brown and green roads are also being tried, but the marigold shade seems to be favored, at least from the optical viewpoint.

A further advantage of the marigold road is that pedestrian crossings or "safety lanes" could then be marked out in different colored concrete and so lie flush with the road. This would be an improvement on the steel-stud system at present used in Britain for marking crossings.

It is believed that the problem of providing colored concrete that will last has been overcome, but this will not be known for certain until further time has elapsed.

Military and air force authorities are naturally watching these tests with interest for their bearing on the camouflage question. Concrete roads colored to tone with the surroundings would be far less visible from the air—an added protection for airdromes and military bases.

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EVOLUTION

Aviation Problems Solved Under Water

Remote Ancestors of Present Day Fish Learned The Tricks of Streamlining, Lift, and Stability

By DR. FRANK THONE

MANKIND is more than a little proud of itself for having, at long last, learned the trick of flying. Takes brains to do that kind of thing, we tell ourselves with an unconcealed smirk.

Yet hundreds of millions of years ago the remote ancestors of our present-day fishes, with scarcely any brains to speak of, solved a very similar problem for themselves, and in a very similar way. Their final solution is, indeed, rather more successful than our best efforts so far—really a better engineering job.

The problem faced by the fishes was nothing less than learning how to swim. It may sound decidedly "fishy" to suggest that there ever were fish that could not swim, but such seems to be the case. The earliest fish of which we have any fossil record—and they were already pretty well advanced evolutionally—spent their lives squatting on the bottom. They had very imperfectly developed fins and tail, and probably could swim only a few strokes before they had to settle down on the sand again. Their swimming was about as much like real swimming as a boy's jumping is like flight.

The struggle of fish for the freedom of the seas, foreshadowing paradoxically man's struggle for the liberty of the air, was portrayed before a meeting of the American Association for the Advancement of Science by an English scientist, John E. Harris of the department of zoology at Cambridge University. Mr. Harris told, point for point, how fish unconsciously adopted the same engineering principles for "flying" in the water that man, with painful conscious thought, ages later found necessary for efficient flying in the air.

Streamlining, which man did not trouble to use in his first flight efforts, was without much doubt an already accepted feature of construction in the very first fish. Nobody has yet seen any fossils of these very first fish, but we do have some fossils of pretty early ones—300 million years, or some such matter, is their age—and they have

quite satisfactorily streamlined bodies. No matter if they didn't swim against the water: in tidal flow or river current the water swam against them, so streamlining was an advantage even at the beginning of things. And if advantageous to these early descendants of the pioneer First Families of Fishdom, then presumably also to the still-unknown pioneers themselves.

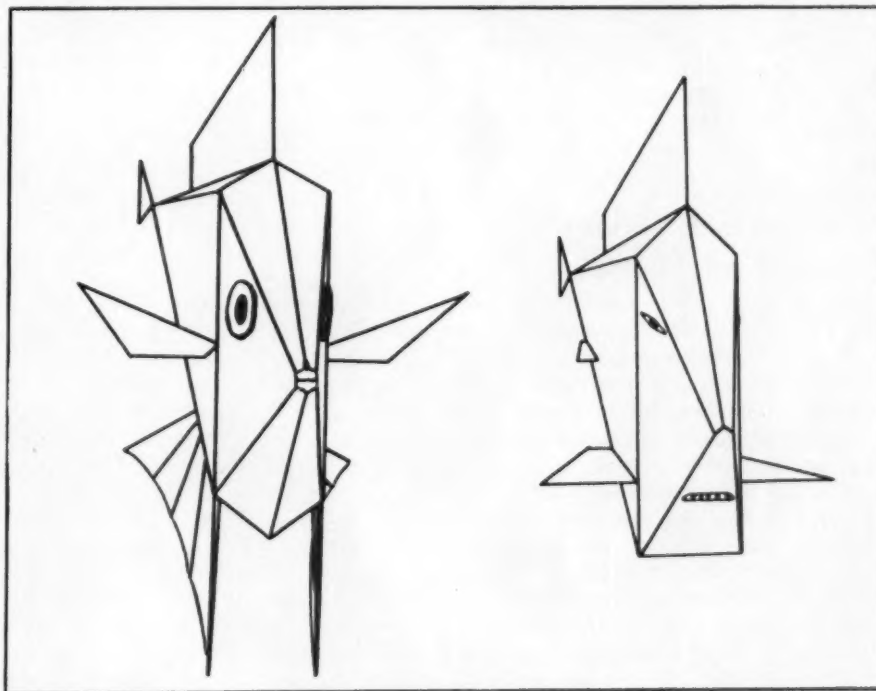
Streamlining in these early fish, however, was not perfect. They were bottom dwellers, and naturally would be pretty flat underneath. A lengthwise section, from head to tail, would have looked very much like a section through an airplane wing: blunt, rounded forward end, gently arched back and flat underside, tapering gradually to a tail-point which may or may not have had a flaring fin at the outset.

When such a primitive fish made one of its half-swimming leaps into the wa-

ter, either to capture some edible morsel drifting overhead or perhaps just because it was tired of staying where it was, its semi-streamlined body brought into play the same kind of forces that act on an airplane wing. The flat underside, shoving at an angle against the mass of water, pushed up. The arched back, moving *away* from the water mass, was *pulled up* by "negative pressure," just as the curved back of an airplane wing gets additional "lift" from the area of low pressure, or "partial vacuum," above it.

So long as the "pre-fish" could keep pushing itself along through the water by vigorous lashings of the after part of its body, it could keep itself lifted above the bottom, and experience the thrill of free, untrammelled motion—supposing an archancestral "pre-fish" to be capable of experiencing thrills. At any rate, it could "airplane" about in the water.

But if you have ever played with toy airplanes, even the simple primitive ones made of folded paper, you will know without be- (Turn to Page 154)



"IDEAL" SWIMMERS

As a designer would draw the ideal fish and shark. The shark, at the right, is an early type fish without swim-bladder whose fins must serve as water-planes to carry weight as well as stabilize. The ideal fish, at left, is of more modern evolutionary date and has a swim-bladder. Its fins are now freed from carrying weight and serve as brakes and stabilizers only.

MENTAL HYGIENE

U. S. Not So Sane Since Depression

THE United States is not so sane as it was before the depression, if the number of mental patients in New York State may be considered typical of the nation as a whole.

More people were in mental hospitals for treatment during the years of the depression than for a corresponding period before that economic catastrophe. During both periods the number was constantly increasing, but in the pre-depression era the increase was at the average rate of 1,600 per year. Since 1929, this increase has jumped to 2,500 per year.

All types of mental disease were affected to some extent by the economic crisis, although it may not have been the dominant fact in the increase in any one disease. This is the conclusion of Dr. Horatio M. Pollock, statistician of the New York State Department of Mental Hygiene, who compiled the figures. (*American Journal of Psychiatry*, January).

The increase in the group of alcoholic insanities was more affected by liquor legislation than by economic conditions, he decided. The number of first admissions to New York State mental hospitals for these psychoses increased from 537 cases in 1929 to 593 in 1932 and then jumped to 706 in 1933, it was revealed.

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PLANT PATHOLOGY

New Currant Variety Resists Rust Fungus

"VIKING" is the sturdy name given to a disease-resistant variety of red currants that may solve the costly problem of white pine blister rust in this country. White pines are tied up with currants and their relatives the gooseberries in the problem of blister rust disease, because the same fungus lives first on the currants or gooseberry bushes, then goes to the pines and ruins them. To save white pine it is necessary to destroy both wild and cultivated currant and gooseberry bushes in the pine forest areas.

Destruction of these favored small-fruit bushes has caused horticulturists much grief and expense, so that resistant substitute varieties are being sought by the U. S. Department of Agriculture. The "Viking" has been tried for

several years under experimental conditions in the greenhouse, Dr. Glenn Gardner Hahn, pathologist of the bureau of plant industry, states in a new Department of Agriculture bulletin. The fruit is excellent, too, so that if the bush can show equally good resistance under field conditions a part of the blister rust problem may be regarded as on the way to solution.

Varieties related to the "Viking" have already shown another valuable characteristic, drought resistance in the prairie regions. It is hoped that the new currant will possess this quality also.

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PATHOLOGY

Tumor Virus Potent After Sixty Freezings

FROZEN and thawed sixty times, the virus or causative agent of one kind of cancer is still potent enough to produce tumors when injected into chickens, Prof. H. E. Eggers of the College of Medicine of Nebraska and Dr. John K. Miller of the Nebraska Methodist Episcopal Hospital and Deaconess Home have reported (*American Journal of Cancer*, Jan.).

The Omaha investigators worked with the famous Rous chicken tumor. Although it is twenty-three years since Dr. Rous showed that this particular kind of tumor can be ground up and filtered without losing its tumor-producing quality, scientists are still uncertain as to whether the causative agent is a living substance or something in the nature of a chemical enzyme, without life but capable of inciting changes in the body which result in cancer.

Prof. Eggers and Dr. Miller started their experiments in the hope of shedding light on this problem.

Because this tumor filtrate could withstand being frozen rapidly with carbon dioxide snow sixty times and sixty times thawed out without losing completely its tumor-producing property, Prof. Eggers and Dr. Miller believe it is probably not a living agent. It showed a resistance to freezing and thawing greater than other known living agents, such as bacteria or other cellular organisms.

But they do not feel their work has completely ruled out the possibility that the agent is living, since the filtrate might contain organized bodies so minute as to escape the effect of sudden and repeated changes of volume.

Science News Letter, March 9, 1935

IN SCIENCE

RADIO-PHYSICS

Roofs to Capture Sunshine; Radio to Broadcast Taste

ROOFs of houses in the year 2035 will be made of photo-electric shingles that will convert sunshine falling upon them into electricity, Dr. Orestes H. Caldwell, editor of *Electronics* magazine, predicted. So plentiful will this electric energy be that he foresees high frequency magnetic oscillations keeping everyone warm inside houses, even though windows are open to winter's breezes. He also predicted that tastes would then be sent by radio so that a jam manufacturer might distribute over the radio a taste sample.

Science News Letter, March 9, 1935

GEOLOGY

Geological "Jawbreakers" In Special Dictionary

WHAT is diastrophism? peridotite? a geosyncline? a batholith?

If you don't know the answers, look them up in Miss Rice's new dictionary of geological terms. "Jawbreakers" as hard as the rocks they label should have no more terrors for struggling students.

Fifteen thousand technical terms are defined in a scientific dictionary of geology, one of the first of its kind ever assembled, which has been completed by Miss Mabel Rice, secretary of the Department of Geology of Princeton University for the past fifteen years. She began her career as a lexicographer in 1920, when she started to jot down unfamiliar terms.

Each definition in Miss Rice's dictionary has been edited or approved by an authority, and she lists various conflicting opinions, in case of a disagreement, in Oxford English Dictionary fashion. The Princeton geological faculty and more than twenty other scientists have aided in the work.

Faculty members and graduate students now consider her card-index of 15,000 geological terms one of their most important pieces of scientific apparatus.

Science News Letter, March 9, 1935

IN FIELDS

ZOOLOGY

Hawaiian Lobster Species Found in South America

HAWAIIAN lobsters are evidently out to see the world. A species of the crustaceans at first known only from Honolulu has turned up on the coast of Natal, where it was identified by E. C. Chubb, curator of the Durban Museum.

The wandering lobster, which has already half encircled the globe, was reported successively from the East Indies, from Reunion Island in the Indian Ocean, and from Mauritius. Zoologists are waiting now to see whether it will continue its journey around the Cape of Good Hope and into the South Atlantic.

Science News Letter, March 9, 1935

ARCHAEOLOGY

Carnegie Scientists to Aid Repair of Mayan Ruins

RUINS of the beautiful Mayan city of Copan, Honduras, shaken by recent earthquake and attacked by encroaching waters of the Copan River, are to receive scientific first aid.

The Government of Honduras has invited the Carnegie Institution of Washington to assist in the repairs and the protective work needed to safeguard the famous ruined city against its enemy, the river.

A report from Gustav Stromsvik, technical expert sent by the Carnegie Institution to Copan, says:

"The ruins have suffered from the all-destroying earthquake; a big chunk of the high bank has fallen into the river. The walls of the beautifully sculptured interior chamber of Mound 22, excavated by Maudslay about fifty years ago, have collapsed. The room can be restored, however, as all the pieces are there, but the part that fell into the river is permanently lost."

From the time of its founding, early in the Christian era, Copan's Indian inhabitants built and re-built temples, pyramids, stairways, and plazas, often enclosing old structures with bigger new

ones, until the result was highly complex. Where the Copan River has cut through the eastern side of the site, a vertical section of ruins, a hundred feet in height, has been exposed, revealing a cross-section of the city's development.

Science News Letter, March 9, 1935

PSYCHIATRY

Play Reveals What is Going On in Child's Mind

A CLUE to what is going on in the mysterious depths of a little child's mind is provided by his play when he is allowed to make up his own games. How the make-believe, the childish drawings, and the story telling of young problem children may be interpreted by the physician to aid in solving their difficulties was related by Dr. Edward Liss, child psychiatrist of New York City, in an address at the Child Research Clinic of the Woods Schools.

Helen, a little girl who was filled with strange fears and who had difficulty with her food, especially before some new situation and on Monday mornings, was one of the children treated with this technique.

Since the child was greatly interested in theatricals, the physician allowed her to use a puppet show and listened as the play went on. Soon the action was centered about food and the "dialogue" proved very illuminating in revealing the child's emotional difficulties.

Tom, who liked to paint and draw, was encouraged to make drawings. The subjects he selected told the physician more plainly than words what was "on his mind."

Study of the free creative play of normal children was urged by Dr. Liss as a basis for comparison with the problem or ill children that come to the physician for treatment.

Science News Letter, March 9, 1935

BOTANY

Seek New Plants In Northern Persia

PERSIA, home of some of the most ancient gardens of the world, is being visited by an agricultural expedition from the Tashkent Institute. The scientists are especially interested in finding new varieties of citrus fruits, tea, date palms and other plants suitable for cultivation in a dry climate.

Science News Letter, March 9, 1935

SEISMOLOGY

Washington's Birthday Marked by Earthquake

WASHINGTON'S birthday was marked by a sharp earthquake shock that disturbed the bottom of the North Pacific in the neighborhood of one of Uncle Sam's remotest landholdings, Attu Island, in the Aleutian chain. On the basis of wire and radio reports collected by Science Service and interpreted by the U. S. Coast and Geodetic Survey, the epicenter was placed in latitude 53 degrees north, longitude 175 degrees east. Time of origin was 12:06.3 p. m., Eastern Standard Time.

Stations reporting were those of the Dominion Meteorological Observatory, Victoria, B. C.; the Manila Observatory, Manila, P. I.; the University of Montana, Bozeman, Mont.; Georgetown University, Washington, D. C.; and the observatories at Honolulu, Sitka and Chicago.

Science News Letter, March 9, 1935

PHYSIOLOGY

Enough Oxygen in Normal Air for All Body Needs

THE AIR normally has more than enough oxygen to supply the needs of the human body, even under conditions of strenuous physical exertion. The amount of oxygen a man consumes in a minute is the same whether he breathes ordinary outdoor air or air containing 40, 60, or 90 per cent. of oxygen.

These are among the conclusions of a study conducted by Dr. Francis G. Benedict at the Nutrition Laboratory of the Carnegie Institution of Washington, located in Boston.

In the experiments the amount of oxygen consumed was measured first while the subjects were at rest, then while they expended measured amounts of energy on a bicycle, and finally while they were recovering following the strenuous exertion. A helmet placed over the subject's head enabled the investigators to measure the amount of oxygen consumed, whether the subject was breathing air, or air enriched with varying amounts of oxygen.

Inhaling oxygen-rich air has no effect on the rate of breathing, either during rest or work, nor did it change the character of material burned in the body during muscular work, but it did affect the heart rate.

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From Page 151

ing told what would happen to our imaginary "pre-fish," with its airplane body but no rudder or stabilizer or ailerons. As soon as its nose got up a little, the continued "lift" of the water would raise it still more, upsetting the unstable equilibrium. The center of lift and the center of gravity would part company, and the poor fish would either go into a series of loops or back-somersaults in the water, or it would swim along inclined at a steep angle to the horizontal, with its tail dragging on the bottom.

First the Tailfin

The first invention of fish, as well as the first invention of airplanes, to remedy this fore-and-aft instability was the development of a tail-fin. In the earliest fish-like fossils, this tail-fin was unsymmetrical, mainly on the underside of the long tail. With the long leverage it thus received, this relatively small surface could counteract effectively the tendency of the body to go into backloops or to stall. When body said "nose up," tail answered "nose down," and the fish could get along fairly well on an even keel.

Another device that could be used for maintaining a proper "nose-down" attitude was to turn down the whole tip of the tail itself. This seems to have been adopted by only a few fossil forms. The foundation of a shark's tail took an exactly opposite direction, with the end of the spinal column bending *up*. However, in both these cases, a fin was developed downwards as well as upwards, the extent of both lobes varying in different species, but always working out so as to prevent excessive nose-tilting. These more generously lobed tailfins, incidentally, gave their owners an added advantage, in that they helped greatly in the body's writhing thrusts forward through the water. Like the gondolier's one oar, they became both propeller and rudder.

Problem of "Roll"

But the fish's problem of getting along through the water was not solved solely by the evolution of a tail, useful though that member became. The problem of lateral stability, or prevention of "roll," had to be taken up also. This became the first job of the paired fins, on opposite sides of the body.

Typically, fishes nowadays have two pairs of these side fins, one pair forward, one pair aft. The forward pair, which sometimes stick out like great

round "ears," are known to zoologists as the pectoral fins; they might therefore be nicknamed the "breast fins." Similarly, the after pair, known technically as the pelvic fins, might be common-Englished as the "hip fins." They are believed to have been at one time only parts of a long, curtain-like continuous fin-fold projecting from each side of the body. But the middle part of this has long since disappeared, leaving only the paired ends.

Efficient from the outset as balancers, these side fins soon added another job, in the case of early fishes, especially sharks, that have no swim-bladder, and therefore have to keep moving in order to avoid sinking to the bottom, just as an airplane must keep moving if it is to remain aloft. In more technical language, sharks and other primitive fish forms must depend on "dynamic lift" to stay up.

Here is where the paired fins came in handy, especially after the fishes, having achieved full freedom of movement in the water, no longer spent most of the time roosting on the bottom. For they then lost their flat under-surface, and so could not present so efficient a lifting device in the shape of the body itself. The shark's paired fins are always held horizontally or nearly so. Nearly at opposite ends of the long shark body, they function in the water rather like the wings and the stabilizers of a low-wing monoplane, giving lift and steadiness at the same time. Naturally, since they function in relatively dense water instead of in thin air, they do not need to have nearly so much surface to be adequate as lifters.

Efficient "Waterplane"

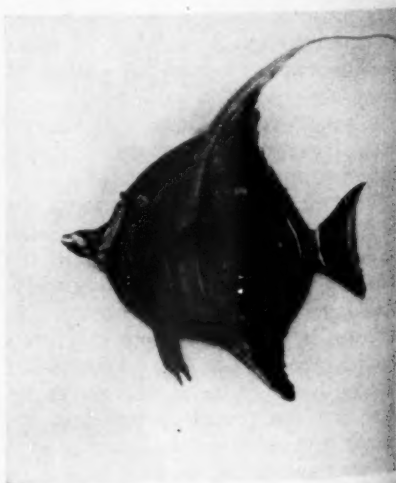
With this equipment, then, the shark is a most efficient "waterplane," able to climb fast and maneuver swiftly, so long as his striving muscles continue to supply engine-power. But if he lets up for a moment, he begins to sink, for he has no swim-bladder as the higher fishes have, and so cannot hover. Perhaps this may account partly for the great number of shark-cousins that have given up the active trade of piracy on the high seas and settled back to their old, dull jobs as scavengers and gleaners on the bottom: rays and skates and guitar-fish, and their weird second cousins the chimeras. These have reverted to the "bellyflopping" habits of their arch-ancestor, and probably surpass even his prone flatness of body.

The great invention of the fishes higher in the evolutionary scale than

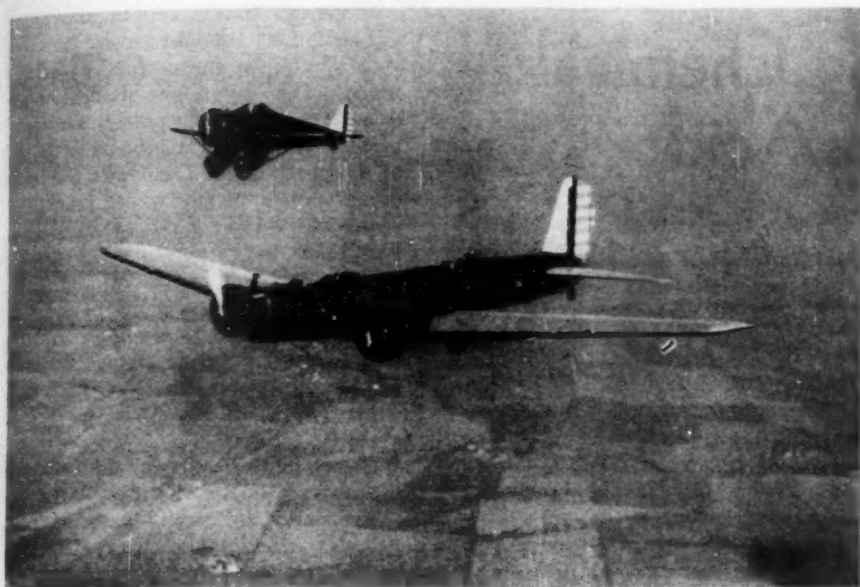
sharks is the swim-bladder. By filling a relatively small part of the body with a fluid much lighter than the one they live in, these higher fishes can "hover" in the water, like a well-ballasted lighter-than-air craft; and the ease with which they do it is increased by the fact that their "center of flotation" coincides very nearly with their center of gravity. The size of the swim-bladder, moreover, is adjustable at will, so that the fish can make himself lighter or heavier, as suits his convenience at the moment.

The Higher Fish

The higher fish, then, is no longer on an airplane basis, no longer needs to keep constantly moving to remain afloat. His muscles can be used entirely for pushing him along through the water, and his fins, no longer needed for lifting purposes, can be devoted more largely to steering and balancing. For the forward pair a new function is added: they have become brakes. Have you never, before an aquarium tank, seen a fish suddenly spread his pectoral fins out wide, like a pair of startled hands, and "come up all standing"? This greater maneuverability, especially this braking trick, is due very largely to the greater flexibility permitted by giving up the fins' function as lifting planes. They can now be trusted on thinner "wrists," and can be turned clear around to a position at right angles to the body axis, instead of being always parallel to it, as in the "planing" sharks. Also, the fins can be folded up to a considerable extent. This reaches its extreme in the flying-fish, where the pectorals (and in some species the aft-



LOST EFFICIENCY
An "advanced" fish that has "gone fancy" and lost its efficiency as a swimmer.



LIKE SHARKS IN THE SEA

These low-wing airplanes, lacking gas-bags to serve as swim-bladders, must depend on their fore and after "fins" to support as well as to balance and steer them.

ermost pair as well) develop to an exaggerated size, but are kept folded back as the fish darts through the water and out into the air. Then they are spread out, and actually function as gliding wings, on which the fish can sail for scores or even hundreds of feet.

Mr. Harris concluded his study of the engineering efficiency of the body designs worked out by fishes for themselves, with a look at their tails. The more primitive or less active a fish, the blunter its tail-lobes, he found, and also the thicker the "stem" between the body and the flare of the tail. Thus, the not-very-speedy cod has a conservatively blunt-flared tail, while the highly efficient swimmers of the mackerel tribe (which includes the long-finned albacore—the "tuna" of the fisheries) have deeply notched, widely flaring tail lobes, narrow and curved sickle-fashion, in just the shape that airplanes would be built if it were structurally feasible. On the albacore at least this same sickle-shape repeats itself in the wide-reaching pectoral fins. And in all the mackerel clan, the tail is on a slim, elegant, tapered "stem," permitting the body to come down to a most efficient end-point of its streamline design.

The illustration on the cover of this week's SCIENCE NEWS LETTER shows fish that have developed their fins to the point where they can, at need, become "tandem gliders" in the air, fleeing from dolphins, which are highly efficient swimmers—probably the fastest of

all water-creatures. The artist, Wilfrid S. Bronson, visions this drama from the under-water, "fish's eye" point of view. The painting is in the Buffalo Museum of Science.

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Science News Letter, March 9, 1935

PSYCHIATRY

Glands and Homes Blamed For Problem Children

GLANDS and chaotic homes were variously blamed for bad behavior of children, in the discussion of the American Orthopsychiatric Association.

Disorders ranging from speech defects, mental retardation and truancy to stealing and sex delinquency were traced to glandular disorder in 93 out of the first thousand children studied at the Cincinnati Child Guidance Home, Dr. Louis A. Lurie said. Glands may so importantly affect the personality and behavior of the child that a thorough examination of the endocrine or ductless glands should be made in the case of every child whose behavior makes him a problem, Dr. Lurie believes. Many of the children he studied were helped by treatment with gland extracts.

Physical causes, contrary to general belief, are not what make children overactive to the point of abnormality,

Dr. Asher T. Childers, psychiatrist at the Central Clinic in Cincinnati, insisted. When a child like eight-year-old Mary C., of normal intelligence, cannot pay attention long enough to get her lessons, is constantly moving about the schoolroom, talks too much and too loudly, is boastful and always seeking attention, the home life is at fault, Dr. Childers found.

Mary and children like her suffer from an unconscious feeling of insecurity and of not belonging permanently to a family, a school or a neighborhood. Living first with one set of relatives and then with another, staying up too late, eating irregularly, going to too many movies, getting no regular training in behavior and self-control are the factors that make dangerously over-active children like Mary. The danger is that when these children grow older, their over-activity takes the form of stealing and truancy among boys and sex misconduct among girls.

The remedy, Dr. Childers discovered, is to have these children live in institutions. The regularity of the life and the interesting as well as inhibiting nature of an institutional program will help them more than anything else.

If Johnny is going to have serious difficulty in learning to read, it can be foretold before he enters the first grade. Eight signs by which the prediction can be made were presented by Dr. Burton M. Castner of Yale University.

The signs include tendency to or family history of lefthandedness, weakness in drawing, inattentiveness, and excitable personality. Not all eight are likely to be found in any one child, and no one of these signs alone is enough basis for predicting that the child will have trouble in learning to read. But a significant combination of them shows that the child in question should be watched so that he can be given special help with his reading troubles before they get so bad that his discouragement over them will distort his personality and make him a behavior problem.

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23 LANGUAGES

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MEDICINE

Cancer-Producing Chemical Made From Bile Acid

Synthesis of Methylcholanthrene at Harvard May Bring Quest for Cancer Cause Closer to Success

BECAUSE Harvard scientists have produced synthetically a cancer-producing chemical, the quest of cancer's cause may now be closer to success.

Production of synthetic methylcholanthrene, cancer-producing chemical previously obtained from bile acid, has been announced at Converse Memorial Laboratory at Harvard by Prof. Louis F. Fieser. Easy manufacture of this chemical is expected greatly to facilitate experiments with mice, attacking the perplexing question of the mechanism whereby hydrocarbons of a particular molecular pattern are able to start malignant growth or cancer.

Acquisition by the organism of certain hydrocarbons related to anthracene of coal tar has previously been defined as a condition which can lead to cancer.

Already the ability of the newly produced chemical and five others to produce cancer in mice is being studied.

Another line of attack is the investigation of chemical transformations of bile acids, sterols, and sex hormones normally present in the body to determine whether any of these can be converted into cancer-producing substances like methylcholanthrene by processes akin to those metabolic processes that normally go on in the body.

Further attempts are being made to synthesize hydrocarbons likely to possess a still higher degree of cancer-producing activity, for this would still further facilitate animal studies and might reveal the nature of the cancer-producing activity.

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ARCHAEOLOGY

Young Woman Scientist Leaves Record of Daring

NOT ALL the archaeological adventures and achievements fall to men.

Down in Honduras, Dorothy Popenoe, young wife of a botanist, obtained important information about the fore-runners of America's great tropical civilizations of the prehistoric world.

Choosing to dig at the Beach of the

Dead, in a sodden, cracking shelf of land overhanging the swift current of the Ulua River, Mrs. Popenoe tied a rope round her waist and set to work. Twice without warning the treacherous shelf cracked and dissolved beneath her feet. But the safety rope held, and she survived the adventure.

From that daring exploit, the young archaeologist brought away nothing very spectacular to capture a public's fancy. The objects she risked her life to salvage are chiefly pottery vessels of plain brown color. The pieces lay buried in the Beach of the Dead with the bones of an ancient people whose manner of living was simpler, and, it seems, earlier than the spectacular glories of Mayan, Aztec, and other Middle American civilizations.

Surviving her first struggle with the river, Mrs. Popenoe returned again when the capricious Ulua permitted. Then, December 30, 1932, she died of a sudden illness.

Now, her discoveries are presented to science in the journal *Maya Research*, and are pronounced of basic value in American prehistory.

The plain colored pottery that she dug from fifteen graves makes an array of spouted vessels, bowls, effigy-shaped vessels, and water jars. They are sufficiently numerous and prevalent to represent a distinct group of people with a culture of their own.

Assigning to them this distinction, Dr. George Vaillant, of the American Museum of Natural History, authority on problems of the dawn era of Middle American civilizations, places the clay wares as "affiliated to other pre-Mayan culture groups in Central America, though probably not the product of the same tribe or people."

This stage of Central American archaeology, he adds, probably contains the seeds of the various civilizations which took growth in Middle America.

And of Dorothy Popenoe, whose interest in ancient America was so intense that she endured hardships repeatedly to study it, he writes:

"It is a tragedy for all her co-workers in the Central American field that Mrs. Popenoe could not have been spared to complete a work with so promising an inception."

Science News Letter, March 9, 1935

Building Blocks of the Universe

ENERGY AND MATTER—By Dr. Charles B. Bazzoni

Second Edition Revised December, 1934

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ORADIO

Tuesday, March 12, 4:30 p. m.

GLAND FACTORS IN PERSONALITY,
by Dr. R. G. Hoskins, Memorial Foundation for Neuro-Endocrine Research, Harvard University.

Tuesday, March 19, 4:30 p. m.

THE STORY OF MAN, by Henry Field, Field Museum of Natural History.

In the Science Service series of radio addresses given by eminent scientists over the Columbia Broadcasting System.

PHYSICS

Stratosphere Flights May Pierce the Ozone Layer

Latest Studies Indicate Ozone Ocean of Upper Air Is Much Lower Than Had Been Thought in Past

THE earth's protective layer of ozone, that cuts down the burning ultraviolet rays from the sun, may be tapped by the next stratosphere flight.

Without the presence of ozone in the stratosphere, life on earth probably would not exist in its present form because the ultraviolet radiation from the sun affects man and other organisms. Tanning and sunburn are but mild forms of what could occur if ozone were not present in the air.

The possibility that forthcoming stratosphere flights may reach the ozone layer arose in discussion on the report of Prof. Rudolf Ladenburg of Princeton University before the joint meeting of the American Physical Society and the Optical Society of America at Columbia University.

Reviewing recent studies of the earth's ozone layer, Prof. Ladenburg indicated that instead of being some thirty-one miles above the region of man the layer appeared to be but fifteen miles up.

Stratosphere balloons with a "ceiling" of 75,000 feet like the proposed ascension of the National Geographic Society-U. S. Army Air Corps will thus be able to get into, and study, the ozone layer.

Important problems await solution by studies of the ozone layer, Prof. Ladenburg indicated. Studies already made show that the amount of ozone in the atmosphere reaches high values in the spring and drops to low values in the fall. Sunlight apparently tends to destroy ozone, rather than to produce it.

Should Search For Other Causes

Future studies of the air's ozone should be directed, Prof. Ladenburg said, to a search for other causes of the protective gas than mere sunlight. It may turn out that electric particles shot off from the sun may create ozone just as they cause the aurora borealis or northern lights. Not only has recent research showed the ozone layer is only about half as high up as science formerly thought, Prof. Ladenburg said,

but there is good evidence that it is not a narrow layer as previously pictured. It probably extends from 60,000 to 100,000 feet, with its maximum concentration coming near 78,000 feet.

How absorbing is ozone for sunlight is shown, the Princeton physicist indicated, by the fact that all the ozone in the earth's atmosphere, if compressed to normal temperatures and pressures, need be but one-tenth of an inch thick to account for sunlight's intensity in the ultraviolet as now measured.

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PUBLIC HEALTH

Fewer Deaths Among Wage Earners Than Ever Before

THE general mortality of the United States was probably slightly higher in 1934 than in 1933, figures thus far available indicate, but the year marked a new low record of mortality among wage earners, Metropolitan Life Insurance Company statisticians find.

The new low death rates apparent in their records show that health conditions have been maintained on a very high level among insured wage earners and their families in the United States and Canada, it is pointed out.

"It is particularly noteworthy that among this insured group the downward trend of mortality over more than two decades has not been interrupted during five years of economic disturbance."

About 68,000 lives were saved in the year 1934 alone over those that would have been lost if 1911 conditions had prevailed, the statisticians figure from comparing their mortality figures for the two years. Over the entire period since 1911 the accumulated saving of lives is now close to 1,000,000.

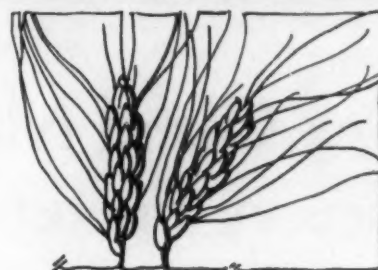
Science News Letter, March 9, 1935

Disappearance of a tiny glass needle of radium from a Michigan doctor's office was recently solved by an electroscope which detected the missing radium under the flooring of a janitor's closet.

CLIMATOLOGY

NATURE RAMBLINGS

by Frank Thone



What Price Wheat?

DUST, riding devastatingly on the wings of Western storms, has once more written its warning large, against the national folly of raising too much wheat and destroying the old cover of soil-binding grass. More than a month ago, U. S. Weather Bureau scientists warned that when the late-February and early-March storms began to blow, dust storms might be expected. And the recent storm may be only the first of the season; others as bad or worse may follow. It is impossible to predict whether any of them will blanket the country as did the tremendous dust storm of mid-April, 1934; but the recurrence of such a portent over the East is not at all impossible.

The cause for such a dust storm is the same as the cause for any wind-storm: large, sluggish masses of air over the mid-continent, warmed by the returning sun, tending to rise as its specific gravity becomes less. Approach of a colder, heavier air mass from the northwest, sliding under the warm air, boosts it up the faster, and the high-velocity winds along the earth's surface suck up the dust and carry it along.

The moral for us of the present generation, scientists point out, is that unless the dust were there, dry and loose, the storm would be little more than an ordinary late-winter windstorm, blustery and uncomfortable, to be sure, but not a menace to crops and a supreme irritation to all business and housekeeping. And the dust is loose because man made it loose. We plowed parts of the West for wheat that nobody ever had any business plowing; the scientists warned us beforehand, and they rub it in now. The dust is good pastureland soil, once held anchored by the roots of

billions of grass plants. We turned out those roots, and plowed and disked and harrowed and loosened the soil to plant wheat. A dry, warm winter kept the soil loose—and the wind did the rest.

Secretary of Agriculture Wallace, "dirt scientist" before he became an administrator, has warned persistently against the loosening of Great Plains

soil in the windstorm belt. The remedy, he and his fellow agronomists and ecologists keep telling us, is: get that dry country back into grass. Plant tree belts, too, if you like, to break the force of the wind; but to tie down every square inch of now truant soil, use the living cords of grass roots.

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PHYSIOLOGY

Sex Gland May Manufacture Scurvy-Preventing Vitamin C

SCURVY-preventing vitamin C, found in certain fruits and vegetables, is manufactured in the bodies of infants and probably also in the bodies of mothers for a time before the infants' birth. Evidence suggesting the maternal manufacture of this important vitamin, apparently as part of nature's provision for prenatal nourishment of the young, has been found by Dr. Geoffrey Bourne of the Australian Institute of Anatomy, at Canberra, Australia.

The discovery is significant because for the most part man at all ages has to depend on his food for his supply of necessary vitamins. So do most other animals. The mother substance of rickets-preventing vitamin D, to be sure, exists in the skin, but irradiation with ultraviolet light is required to convert this substance into the vitamin. The only other exception is the probability that fish like the cod manufacture in their bodies at least some vitamin D.

The starting point for Dr. Bourne's experiments, it appears from his technical report (*Nature*, Jan. 26) was the research of other scientists who found that the human infant up to the age of five months manufactures vitamin C in

its own body, and that pregnant guinea pigs fed a scurvy-producing diet developed the disease only very slightly or not at all.

Dr. Bourne also knew that the ovarian structure known as the corpus luteum has a high concentration of vitamin C in its cells. This structure produces a hormone, progesterin, which prepares certain maternal tissues for the reception and nourishment of the beginning embryo.

In Dr. Bourne's experiment a pituitary gland hormone was given to young virgin rats to stimulate the production of the corpus luteum tissue. These rats and two other groups of rats, some pregnant and the others untreated virgin animals, were then fed a scurvy-producing diet. The untreated animals all died of typical scurvy within a fortnight. The pregnant rats lost very little weight and appeared much the same at the end of the experiment as at the beginning. The treated rats lost considerable weight but were active and showed no signs of scurvy, although two died of an acute infection.

The experiment "suggests," in Dr. Bourne's scientifically conservative words, that the corpus luteum which is

already known to prepare the uterus for the reception and nourishment of the developing offspring also can manufacture vitamin C. The experiment, however, does not disprove the manufacture of vitamin C by the unborn infant. Dr. Bourne says it is probable that the vitamin manufacture takes place first in the corpus luteum and then is either taken over or supplemented by the infant once it has developed from the embryo to the fetal stage.

Science News Letter, March 9, 1935

METEOROLOGY

Much Snow on Mountains For Next Summer's Needs

WEATHER observers in the mountain areas of the West, where summer irrigation must depend on snows of the preceding winter, report encouraging conditions to the central office of the U. S. Weather Bureau in Washington, D. C. In the mountains of the Pacific coast states especially the snow packs are deep and heavy, and on the whole much greater than last year's; at the same time the water already in the soil is more abundant. Farther east, in the Great Basin and Rocky Mountain regions, soil water is not so nearly up to standard, due to cumulative drought of several years, but the snow supplies on the upper slopes are encouragingly large.

Science News Letter, March 9, 1935

PHYSICS

New Theory Increases Electron's Size Ten Times

A NEW theory of the electron's size which makes it ten times larger than previously held concepts of scientists was announced by the world-famous physicists, Prof. Max Born of Cambridge University and Prof. Erwin Schroedinger of Oxford University. (*Nature*, March 2.)

The electron is one of the fundamental particles out of which all matter is composed. Present estimates of the electron's size suggest that some ten trillions of them side by side would be less than a half inch long.

Prof. Schroedinger was co-winner of the 1933 Nobel Prize in Physics, and Prof. Born has long been noted for his mathematical theories of atomic structure. Both men are former German scientists now in the academic shelter of England.

Science News Letter, March 9, 1935

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•First Glances at New Books

Child Psychology

INFANT BEHAVIOR, ITS GENESIS AND GROWTH—Arnold Gesell and Helen Thompson, assisted by Catherine Strunk Amatruda—*McGraw-Hill*, 343 p., \$3. Those who have wished that they might own the monumental work of these authors, "An Atlas of Infant Behavior," will welcome this new work which deals with the findings of the study of which the atlas was a photographic portrayal.

Science News Letter, March 9, 1935

Psychology

THE PROBLEM OF NOISE—F. C. Bartlett—*Cambridge Univ. Press*, 87 p., \$1.25. In a brief and very readable book, this British author shows that the case against noise, although exaggerated, is based upon scientific fact. He also makes suggestions regarding what can be done about the problem.

Science News Letter, March 9, 1935

Social Work

HANDBOOK FOR FIELD WORK STUDENTS (FAMILY WELFARE)—Ed. by Margaret C. Bristol and Catherine Dunn—*Univ. of Chicago*, 55 p., 50 c. A manual appearing as number 26 of the Social Service Monographs.

Science News Letter, March 9, 1935

Psychology

NEGRO INTELLIGENCE AND SELECTIVE MIGRATION—Otto Klineberg—*Columbia Univ. Press*, 66 p., \$1.25. The importance of environment in influencing intelligence test scores of the Negroes is stressed in this monograph which was prepared under the auspices of the Columbia University Council for Research in the Social Sciences.

Science News Letter, March 9, 1935

Philosophy

MIND, THE MAKER—Cassius Jackson Keyser—*Scripta Mathematica*, 31 p., 35c. "No longer do we seek for Cause in the material whirr and whizz, any more than in the capers of a 'talkie.' The Cause is to be sought in the Reality, the Spirit (Psyche), where the Actuality is forecast and determined, as the movie spectacle by its makers. So is our interest in the Actual world of Phenomena by no means unduly lessened, but our interest in the real world of Noumena is indefinitely augmented. The deep problems of this Real world are far from solved, the mysteries of Being, of Life and Death, of Good and

Evil, of Joy and Pain, of Continuum and Excluded Middle—all remain unexplored though no longer hopelessly inexplorable: the Cone of Humanity widens and deepens its darkened base, but it also lifts a dazzling apex into holier heights."

Science News Letter, March 9, 1935

Medicine

THE HUNDRETH MAN—Cecil de Lenoir—*Kendall*, 288 p., \$3. The story of a narcotic drug addict said to be "cured" of his addiction, this book is evidently written to show the evils of drug addiction and at the same time to encourage other addicts to try to free themselves from their habit.

Science News Letter, March 9, 1935

Geography

AFRICA, A SOCIAL, ECONOMIC AND POLITICAL GEOGRAPHY OF ITS MAJOR REGIONS—Walter Fitzgerald—*Dutton*, 462 p., 90 maps, \$5. Written for those seeking facts, and making no concession to "reader interest," this volume is crammed with geographic information. A comprehensive manual on this subject has not been produced in English in almost three decades; so the work of the University of Manchester's senior lecturer in geography fills an obvious gap in reference literature.

Science News Letter, March 9, 1935

General Science

SCIENCE IN OUR WORLD OF PROGRESS—George W. Hunter and Walter G. Whitman—*American Book Co.*, 581 p., \$1.60. For junior high school use sixteen units are presented ranging from "Putting the Environment to Work" to "National Protection of Health." The other chapters cover such broad topics as air, water, heat, radiations, electricity, machines, transportation, communication, astronomy, geology, living things, food, etc.

Science News Letter, March 9, 1935

Zoology

NEW FISHES OBTAINED BY THE CRANE PACIFIC EXPEDITION—Albert W. Herre—*Field Museum of Natural History*, 438 p., 50c.

Science News Letter, March 9, 1935

Medicine

THE PATIENT AND THE WEATHER: VOL. II, Autonomic Dysintegration, VOL. III, Mental and Nervous Diseases—William F. Petersen and Margaret E. Milliken—*Edwards Bros., Inc., Ann Arbor, Mich.*, Vol. II, 529 p., \$6.50, Vol. III, 379 p., \$5.00. The relation of climate and weather to health is receiving increasing attention from medical scientists of late, although, as Dr. Petersen points out, such a relation was observed and described by Hippocrates and by many of the early doctors who studied disease at the bedside before chemical and physical laboratories were available to help in the practice of medicine. Dr. Petersen presents his own extensive studies in this series of volumes, of which the first is yet unpublished. The books are intended for physicians and are too technical for lay reading. They are illustrated by many charts and maps, and occasional photographs.

Science News Letter, March 9, 1935

Sociology

DEMOCRACY FACES THE FUTURE—Samuel Everett—*Columbia Univ. Press*, 269 p., \$2.50. A very useful factual and analytical treatment of the many factors in the broad fields of esthetics, science, government and economics that comprise what is known broadly as democracy. For those who are attempting to see light through the maze of changes which we are undergoing, this book will be stimulating. Some of the chapters are heavily documented.

Science News Letter, March 9, 1935

Psychology

STAMMERING AND ALLIED DISORDERS—C. S. Bluemel—*Macmillan*, 182 p., \$2. The author explains stammering upon a physiological basis in terms of interference with conditioned reflexes.

Science News Letter, March 9, 1935

Photography

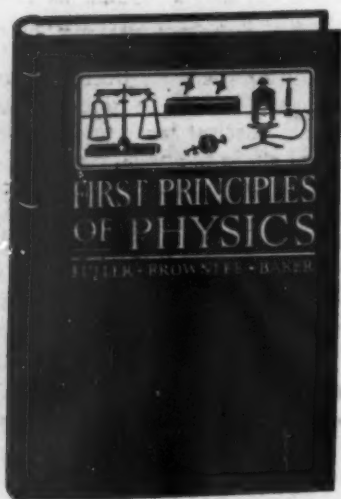
ELEMENTARY PHOTOGRAPHIC CHEMISTRY—*Eastman Kodak Company*, 132 p., \$1. This corrects price quoted in SCIENCE NEWS LETTER of February 16, 1935.

Science News Letter, March 9, 1935

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THE WORLD OF PHYSICS

FROM THE EARLIEST RECORDS of man's activities we learn that he has constantly sought to utilize and control the forces of Nature and to simplify and classify them, the better to understand their operation. The control of these forces has brought him practical results of greatest importance; the study of them has brought him a freedom from superstition, a stirring of the imagination, and a training of the reasoning faculties.

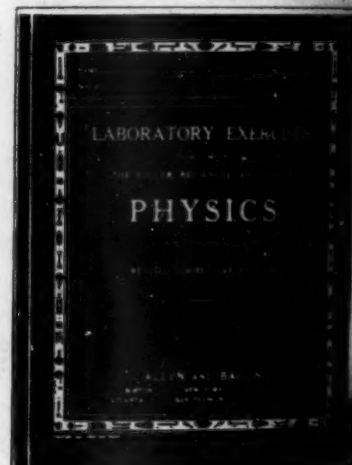


In the field of applied Physics we see that our lives have been modified at every point. Industry and manufacture, transportation by air, land, and sea, communication by wire and by radio, our understanding of our own bodies by X-ray and microscope have all been established on a new and surer basis as the result of the patient research and logical deduction of the experimentalist in Physics. It would be less difficult to list separately this multitude of magnificent achievements than to discover one aspect of our lives that Physics has not altered.

While the ignorant man accepts without question these practical achievements, the intelligent man yields ever more readily to the adventure and romance of the patient search for truth. Inquiring minds turn outward to the boundaries of space and inward to the mysteries of atomic structure. In unfolding the plan of Nature men gain the satisfactions that come from a quickened imagination, from a dependable habit of thought, and from the discipline that checks reason against experiment at every step.

The ideal textbook in Physics simplifies this task of the teacher by presenting in clear easy language not only the facts but also the inspiration and logic by which general principles are derived from these facts. Such a book enables the pupil to teach himself by text, illustration, and application of facts to his environment, to test himself by simple fact questions at frequent intervals and by a wide range of thought-provoking exercises and objective tests.

The ideal textbook aids the successful teacher of Physics to do more than interest his pupils in the practical aspects of a noble science. It helps him to lead them to lay for themselves a foundation of respect, interest, and trust, in a body of knowledge that represents one of the highest achievements of their race.



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